

VASCULAR EPIPHYTES OF MEXICO: A PRELIMINARY INVENTORY

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ABSTRACT. Integrated information and systemic accounts of epiphytes in regions of the world have recently been compiled. The purpose of this paper is to assemble an account of the vascular epiphytes that occur in Mexico as a starting point for other studies. Information has been gathered from the literature, specimens of seven Mexican herbaria (MEXU, CHAPA, AMO, IZTA, ENCB, XAL, UAMI), recent field collections, cultivated material, and personal communication with specialists. At present, this assembly comprises 37 families, 174 genera, and 1,207 species. There are 12 important families. Of the 42 seed plant families documented in the literature as occurring in the neotropics, 28 are found in Mexico. The total number of species is estimated at 10% of the vascular plant species of Mexico, which is consistent with the estimated proportion of vascular epiphyte plant species worldwide. In spite of important efforts devoted to the study of some of the families, e.g., Orchidaceae, this assembly of species with high biological and potential economic values, requires more extensive study. These plants are poorly represented in herbaria and live collections.

Epífitas vasculares de México: diversidad y conocimiento biológico.

RESUMEN. Se ha reunido información y registros sistemáticos cuantitativos de las epífitas de diferentes regiones del mundo. El propósito de esta investigación es la de integrar un análisis cuantitativo de las epífitas vasculares presentes en México como un punto de partida para otros estudios. La información ha sido reunida partiendo de fuentes bibliográficas, de datos contenidos en especímenes de siete herbarios mexicanos (MEXU, CHAPA, AMO, IZTA, ENCB, XAL, UAMI), de recientes colectas de campo, de material cultivado, y de comunicaciones personales con especialistas. Hasta este momento, el acervo comprende 37 familias, 174 géneros, y 1,207 especies. Existen 12 familias importantes. De las 42 familias de plantas con semillas reportadas en la literatura para el neotrópico, 28 se encuentran en México. El número total de especies podría estimarse en alrededor del 10% de las especies de plantas vasculares mexicanas, lo que está de acuerdo con la proporción estimada de epífitas vasculares de la flora mundial. A pesar de los esfuerzos dedicados al estudio de algunas de las familias, v.g., Orchidaceae, este conjunto de especies con un alto valor biológico, incluyendo un valor económico potencial, requiere un estudio más extenso. Estas plantas están pobremente representadas en colecciones herborizadas y vivas.

INTRODUCTION

Epiphytes are characteristic elements of many plant communities in Mexico, ranging from tropical rain forest to arid tropical scrub. Mexican epiphytes have received attention since the eighteenth century, through studies of the Royal Botanical Expedition of New Spain (1787–1803) and papers such as those of La Llave and Lexarza (1825), Ross (1908), Purpus (1925, 1930) Matuda (1949, 1980), and others. More recently, studies of vascular epiphytes in Mexico have dealt with aspects of their physiology and ecology (Stuart, 1969; Sipes & Ting, 1985; Croat, 1986).

In accordance with the development of a comprehensive analysis of vegetation types and a growing interest in regional floristics of Mexico, information has been gathered to produce and update lists of plant families, including two of the biggest families with epiphytic elements, Bromeliaceae (García-Franco, 1987) and Orchidaceae (Soto-Arenas, 1988). It is the purpose of this paper to provide an updated account of the diversity of vascular epiphytes in Mexico and

present some considerations on their distribution as a basis for future studies.

MATERIALS AND METHODS

Information was gathered as part of a long-term project on the epiphytes of Mexico. This project started in 1989 as a sabbatical leave at the Instituto de Biología, Universidad Nacional Autónoma de México. Seven Mexican herbaria were selected for their collections of general Mexican flora (MEXU, CHAPA, ENCB, UAMI); regional flora (XAL, state of Veracruz; IZTA, state of Mexico); and the Orchidaceae (AMO, Mexican and Central American Orchidaceae). Specimen data were compiled to conform a database for future studies. Specimens were considered epiphytic following the definitions of Madison (1977), Kress (1986), and Gentry and Dodson (1987). Additional information sources included literature, past and recent field collections that are not yet accessed to herbaria, field notes and observations of the author, cultivated material (personal and

TABLE 1. SYSTEMATIC OCURENCE OF VASCULAR EPIPHYTES OF MEXICO.

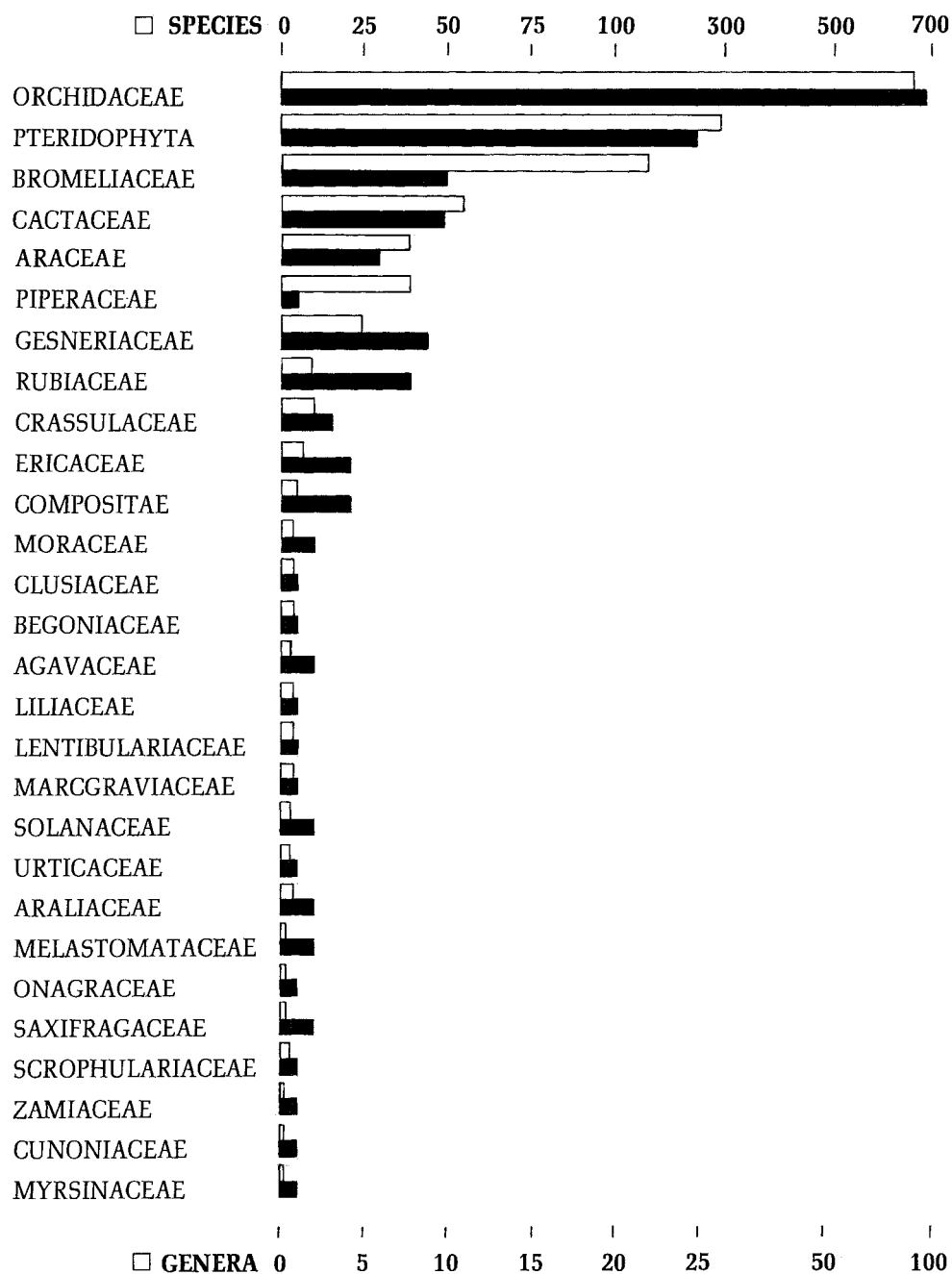


TABLE 2. MAJOR VASCULAR EPIPHYTE FAMILIES FOUND IN MEXICO.

		GENERA	SPECIES
SEED PLANTS	ORCHIDACEAE	110	678
	BROMELIACEAE	10	165
	CACTACEAE	12	55
	ARACEAE	6	40
	PIPERACEAE	1	40
	GESNERIACEAE	9	23
PTERIDOPHYTA	6 FAMILIES	26	300

institutional), and personal communication with specialists.

RESULTS AND DISCUSSION

In spite of intensive collecting and botanical reports on several of the families, it is not yet feasible to provide and update a systematic list of the vascular epiphytes of the whole country. Some reasons for this situation are: incomplete collections, poorly collected or uncollected regions, rare species, technical difficulties of collecting, and lack of specialists in local institutions. However, it is possible to use collections in Mexican herbaria and regional works (Zuill & Lathrop, 1975; Rzedowski & Palacios-Chávez, 1977; Lira & Riba, 1984; Breedlove, 1986; Magaña, 1987; Huidobro, 1988) to make an estimate of the number of vascular epiphytes of Mexico.

A total of 2,905 specimens preserved were examined to provide a general estimate of the systematic occurrence of vascular epiphytes in Mexico (TABLE 1). Twelve major families were found (TABLE 2).

Some Mexican epiphytes have been studied for a long time, particularly Orchidaceae and Bromeliaceae. Other well-known groups are in the Araceae, Cactaceae, Pipearaceae, Polypodiaceae, and Crassulaceae. The number of seed plant families in the Neotropics is estimated at 42 (Gentry & Dodson, 1987). Of these, 28 families are found in Mexico. An estimated 1,377 species of epiphytes occur in Mexico (191 seed plant genera and 26 fern genera). However, these are not the final records. A flora of Mexico is not

yet finished and estimates of its actual size may be as high as 30,000 species (Toledo, 1988). Considering more complete research in partially known or new areas, a final proportion of vascular epiphytes might be about 10% of the total. This assumption is based on the known 20,248 vascular plant species documented to date in Mexico (Toledo, 1988) and the number of epiphyte species reported here, which gives a proportion of 6.8% of the total flora being epiphytic. This is consistent with the estimated ratio between vascular epiphytes and vascular plants worldwide (Gentry & Dodson, 1987; Benzing, 1987).

The distribution of epiphytic plants within Mexico is poorly known. Their occurrence in each of eight vegetation types is in TABLE 3. Montane rain forest and the rain forest are richer in epiphytes than in other communities, which may be a function of optimal moisture and mineral cycling regimes. A careful evaluation of variation in species richness among sites in the same community is needed. Valdivia (1977) reported 87 orchid species in 24 genera in a rain forest of Uxpanapa, Veracruz, where the total annual precipitation is 2,600 mm. Soto-Arenas (1986) documented 121 epiphytic orchid species in 50 genera in the rain forest of Bonampak, Chiapas, which has an annual precipitation of 2,609 mm. A single factor cannot provide an explanation for these differences in species richness. Rather, a group of environmental data (e.g., rain distribution throughout the year, length of dry periods) is necessary to explain these patterns. Rainfall appears to be an important factor in epiphyte distribution, as most epiphytes are found in areas

TABLE 3. VASCULAR EPIPHYTE SPECTRA OF 8 VEGETATION TYPES IN MEXICO.

	MONTANE RAIN FOREST	RAIN FOREST	PINE - OAK FOREST	DECIDUOUS SEASONAL FOREST	SEMI - EVERGREEN SEASONAL FOREST	BOREAL FOREST	THORN WOODLAND	CACTUS SCRUB DESERT
ORCHIDACEAE	●	●	●	●	●	●	●	●
PTERIDOPHYTA	●	●	●		●	●		
BROMELIACEAE	●	●	●	●	●	●	●	●
CACTACEAE	●	●	●	●	●	●	●	●
ARACEAE	●	●	●	●	●			
PIPERACEAE	●	●	●			●		
GESNERIACEAE	●	●	●	●	●			
RUBIACEAE	●	●	●					
CRASSULACEAE	●		●					
ERICACEAE	●							
COMPOSITAE	●	●	●	●	●			
MORACEAE	●	●		●	●			
CLUSIACEAE	●	●	●	●				
BEGONIACEAE	●	●						
AGAVACEAE		●	●					
LILIACEAE	●	●						
LENTIBULARIACEAE	●		●					
MARCGRAVIACEAE	●	●						
SOLANACEAE	●		●					
URTICACEAE	●							
ARALIACEAE	●							
MELASTOMATACEAE	●	●						
ONAGRACEAE	●		●			●		
SAXIFRAGACEAE	●							
SCROPHULARIACEAE	●				●			
ZAMIACEAE	●							
CUNONIACEAE	●							
MYRSINACEAE		●						

where the total annual precipitation ranges between 500 and 5,000 mm.

In addition to more field surveys to complete species lists of vascular epiphytes, I suggest a number of other studies of Mexican epiphytes: 1) associations of epiphytes with tree fern and palm trunks, 2) deciduousness as a character of vascular epiphytes (e.g., *Fuchsia fulgens*, *F. decidua* and *Alsobia punctata*), 3) nastic responses in Gesneriaceae, especially nyctinasty (e.g., *Alsobia punctata*), 4) the role of nonvascular epiphytes in the germination and establishment of vascular epiphytes (Delgadillo, 1976), and 5) the possible role of vascular epiphytes such as *Tillandsia fasciculata* var. *venosispica* in the germination and establishment of nonepiphytes such as *Clusia massoniana* when the former falls from a tree (Aguirre, Moreno & Soto, unpubl. data).

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